Division of Air Quality
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# MEMORANDUM

**TO** : OPS, PPS, and BTS Supervisors December 14, 2010

**FROM :** John Preczewski, Assistant Director
Air Permitting Element

**SUBJECT :** Revised Interim Permitting and Modeling Procedures for New or Modified Sources Emitting between less than 100 Tons per Year of $PM_{2.5}$ (Fine Particulate) and Proposing between a 10 – 99 ton per year increase in $PM_{2.5}$

This revises the Division of Air Quality's March 17, 2009 memo on permitting and modeling procedures for EPA defined minor $PM_{2.5}$ sources to incorporate recent guidance on $PM_{2.5}$ permitting and modeling. In addition to the previous released document *Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$), Final Rule* (May 16, 2008 Federal Register), the following guidance on $PM_{2.5}$ sources has been released in the last year:

> *Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS*, from Tyler Fox, February 26, 2010,
>
> *Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS*, from Stephen D. Page, March 23, 2010,
>
> *Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$) – Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC); Final Rule* (October 20, 2010 Federal Register).

The revised attachment also incorporates the most recent available monitored $PM_{2.5}$ data from 2009 into the background measurements.

As before, these revised procedures are separate from guidance for EPA defined PSD and 40 CFR Part 51, Appendix S major sources and major modifications. Those sources would include any **new** facility that has the potential to emit 100 TPY or more of $PM_{2.5}$ emissions, or any **existing** facility that has the potential to emit 100 TPY or more of $PM_{2.5}$ emissions that is proposing net emissions increase of 10 TPY or more of $PM_{2.5}$.

Sources subject to this memo are defined as proposed projects with net emissions increases of $PM_{2.5}$ of 10 tons/year or more that trigger N.J.A.C. 7:27 Subchapter 18

(Emissions Offset Rule), but are not of a sufficient magnitude to trigger PSD or Appendix S applicability. These procedures are designed to avoid the creation of new $PM_{2.5}$ NAAQS violations in areas where the monitored $PM_{2.5}$ levels are currently below the NAAQS.

The attached interim $PM_{2.5}$ permitting/modeling procedures become effective January 1, 2011.

c: William O'Sullivan (Director, DAQ)

# Revised Interim Permitting and Modeling Procedures for Sources Emitting between 10-100 Tons per Year of $PM_{2.5}$ (Fine Particulate)

## I. Background

The $PM_{2.5}$ NAAQS was originally promulgated by EPA in July 1997, and later revised in December 2006. EPA defines a nonattainment area as an area that is violating the $PM_{2.5}$ NAAQS (either 24-hour or annual), or a nearby area that is contributing to a violation of the $PM_{2.5}$ standards.

| Pollutant | NAAQS | Averaging Times | Secondary Stds. |
|---|---|---|---|
| Particulate Matter ($PM_{2.5}$) | 15.0 µg/$m^3$ | Annual [a] | Same as Primary |
| | 35 ug/$m^3$ | 24-hour [b] | Same as Primary |

a. To attain this standard, the 3-year arithmetic mean of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/$m^3$.
b. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations must not exceed 35 ug/$m^3$.

The following 13 New Jersey counties are currently designated nonattainment by EPA for the $PM_{2.5}$ NAAQS: Bergen, Burlington, Camden, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union. These counties are shown in yellow in Figure 1.

## II. Interim $PM_{2.5}$ Permitting Procedures

### 1. Determination of $PM_{2.5}$ Emissions

The applicant may either assume that $PM_{2.5}$ emissions are equivalent to $PM_{10}$ emissions or, if supporting data exists, quantify the portion of emissions that are $PM_{2.5}$. The applicant must include condensible particulate emissions in their applicability determination and modeling analysis. On December 1, 2010, EPA promulgated a stack testing methods 201A and 202 for $PM_{2.5}$ that includes condensibles.

The applicability of sources affected by the $PM_{2.5}$ nonattainment NSR described in this memo will be based on direct $PM_{2.5}$ emissions. Precursors will not be included in the applicability determination, nor can they be used to offset direct $PM_{2.5}$ emissions.

### 2. Netting Procedures

$PM_{2.5}$ nonattainment NSR applicability determinations will use the netting procedures described in N.J.A.C. 7:27-18.7 (Determination of a net emission increase or a significant net emission increase).

### 3. Significant Impact Levels

EPA promulgated $PM_{2.5}$ significant impact level (SIL) in its October 20, 2010 Federal Register notice concerning PSD for $PM_{2.5}$ sources. They are indentical to the

interim $PM_{2.5}$ SILs that were specified in the March 17, 2009 memo. The following $PM_{2.5}$ values must be applied in the evaluation of both attainment and nonattainment sources in PSD Class II areas:

Annual SIL - 0.30 ug/$m^3$,
24-hour SIL - 1.2 ug/$m^3$.

4. Compliance Plan

A $PM_{2.5}$ emission limit shall be placed in the permit. Compliance with this $PM_{2.5}$ emission limit shall be determined using EPA's promulgated stack test method for PM-2.5 (Stack Test Methods 201A for measurement of filterable PM-2.5 and Method 202 for measurement of condensible particulate emissions). Compliance with the $PM_{2.5}$ emission limit will be demonstrated with the promulgated stack test method.

5. Applicability

***These procedures will apply to permit applications with a proposed project net emissions increase of $PM_{2.5}$ of 10 tons/year or more that trigger Subchapter 18, but are not of a sufficient size to qualify as a PSD or an Appendix S major source or major modifications.***

As required in N.J.A.C. 7:27-18.2 applicability section, if a source is major for one criteria pollutant, it is considered major for all. Therefore, $PM_{2.5}$ nonattainment NSR would apply to all proposed major Subchapter 18 projects with a 10 ton/year or more significant net emissions increase in $PM_{2.5}$.

The major source thresholds as defined in Subchapters 18 and 22 and the significant net emissions increase levels defined in Subchapter 18 are listed below.

| Air Contaminants | Major Source Thresholds (tons/year) | Significant Net Emission Increase Thresholds (tons/year) |
|---|---|---|
| Carbon monoxide | 100 | 100 |
| PM-10 | 100 | 15 |
| TSP | 100 | 25 |
| Sulfur dioxide | 100 | 40 |
| Oxides of nitrogen | 25 | 25 |
| VOC | 25 | 25 |
| Lead | 10 | 0.6 |

The $PM_{2.5}$ significant net emissions increase of 10 tons/year is based on the level specified in the *Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)* (Final Rule, May 16, 2008) and now listed in 40 CFR Part 51, Appendix S.

6. Emission Offsets

The revised interim guidance continues to allow offset ratios of 1:1 and, on a case-by-case basis, offset ratios less than 1:1 for sources having a significant impact in a monitored nonattainment area (see Figure 1). The higher offset ratio and distance requirements listed in N.J.A.C.7:27-18 for $PM_{10}$ is not being applied to $PM_{2.5}$ at this time because $PM_{2.5}$ concentrations are more regional in nature than $PM_{10}$. The offsets may be obtained anywhere in the monitoring nonattainment area where the source is located. Offsets may also be obtained outside the monitored nonattainment area. However, if this option is selected a modeling analysis must be submitted that demonstrates the proposed emission offsets will result in a reduction of $PM_{2.5}$ concentrations in the monitored nonattainment area that are approximately equivalent to the magnitude of the proposed increase.

In addition to considering offsets from existing stationary sources, applicants are encouraged to investigate possible $PM_{2.5}$ reductions from mobile and other ground-level $PM_{2.5}$ sources. Funding retrofit emission controls to on- road or off-road diesel vehicles or electrification of bays at a truck stop to reduce diesel idling emissions are examples of possible offset sources. A portion of banked particulate emission reductions credits may be used as $PM_{2.5}$ offsets if the $PM_{2.5}$ fraction can be reasonably established and other offset requirements met.

## III. Permit Procedures

A key feature of these permitting procedures is the determination of whether the source is located in an area of monitored $PM_{2.5}$ nonattainment or in an area of monitored $PM_{2.5}$ attainment. The monitored values 2007-2009 monitored values are presented in Table 1.

1. In EPA's designated New York/North New Jersey/Connecticut nonattainment area, the following locations in New Jersey are currently in monitored $PM_{2.5}$ nonattainment:

a. Monitored $PM_{2.5}$ 24-hour Nonattainment Area
None

b. Monitored $PM_{2.5}$ Annual Nonattainment Area
None

2. In EPA's designated Philadelphia/Camden/Wilmington nonattainment area, the following locations in New Jersey are currently in monitored $PM_{2.5}$ nonattainment:

a. Monitored $PM_{2.5}$ 24-hour Nonattainment Area
None

b. Monitored $PM_{2.5}$ Annual Nonattainment Area
None

The location of the NJDEP $PM_{2.5}$ monitors can be found at http://www.njaqinow.net/App_Files/2009/2009net.pdf.

3. Sources Located in an Area with Representative Monitored Values Above the $PM_{2.5}$ NAAQS (Monitored $PM_{2.5}$ Nonattainment Areas)

These procedures are designed to minimize the increase in ambient air impacts in areas where monitored $PM_{2.5}$ levels are currently above the NAAQS. Air quality modeling will be conducted for the proposed $PM_{2.5}$ net emissions increase. If the source's modeled $PM_{2.5}$ impact is above the $PM_{2.5}$ SIL for the relevant averaging time (24-hour or annual), the source should first try and take steps to reduce its ambient impact to less than the SIL. Possible strategies for reducing its impact include reducing the proposed $PM_{2.5}$ emissions increase or increasing the stack height.

If the source's impact can not be reduced by these means, direct $PM_{2.5}$ emission offsets should be obtained in the same monitored nonattainment area to reduce local $PM_{2.5}$ concentrations. A less than a 1:1 ratio for these offsets is acceptable. In addition, offsets may also be obtained outside the monitored nonattainment area. However, if the $PM_{2.5}$ offsets are either at a less than 1:1 ratio or obtained outside the monitored nonattainment area, a modeling analysis must be submitted that demonstrates the proposed emission offsets will result in a reduction of $PM_{2.5}$ concentrations in the monitored nonattainment area that are approximately equivalent to the magnitude of the proposed increase.

4. Sources Located in an Area with Representative Monitored Values below the $PM_{2.5}$ NAAQS

These procedures are designed to avoid the creation of new $PM_{2.5}$ NAAQS violations in areas where the monitored $PM_{2.5}$ levels are below the NAAQS. Air quality modeling will be conducted for the proposed $PM_{2.5}$ net emissions increase. Inclusion of other nearby large $PM_{2.5}$ sources in the modeling, if needed to more accurately define background $PM_{2.5}$ levels, will be determined on a case-by-case basis.

If the modeled $PM_{2.5}$ impact plus representative background exceeds the 24-hour or annual $PM_{2.5}$ NAAQS, then a determination is made whether the source's contribution to the NAAQS violation exceeds the $PM_{2.5}$ SIL for the relevant averaging time. If so, the source must take steps to eliminate the violation or reduce its impact below the SIL. Potential strategies for reducing its $PM_{2.5}$ impact include the following: reducing emissions, increasing stack height or obtaining emission offsets from existing sources. The emission offsets and other mitigation measures secured must be modeled to verify they result in the elimination of the predicted violation or reduction in the source's impact to below the $PM_{2.5}$ SIL.

## IV. Compliance with the $PM_{2.5}$ PSD Increments

The October 20, 2010 FR (*Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$) – Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC); Final Rule*) promulgated Class I, II,

and III $PM_{2.5}$ PSD increments. Compliance with the PSD increments will only need to be demonstrated in the areas of New Jersey that EPA designated as in attainment with the $PM_{2.5}$ NAAQS. As indicated in Figure 1, the counties of Sussex, Warren, Hunterdon, Ocean, Atlantic, Cumberland, Salem, and Cape May are designated attainment by EPA.

The new emissions from the minor $PM_{2.5}$ sources covered by this memo will consume PSD increment after the "minor source baseline date" is set at its location. The $PM_{2.5}$ PSD increments promulgated on October 20, 2010 become effective October 20, 2011. October 20, 2011 is considered the "trigger date". The minor source baseline date is set on the earliest date after the trigger date on which a source or modification submits the first complete application for a PSD in a particular area. After the minor source baseline date, any increase in actual emissions from minor sources consumes the PSD increment for that area. Therefore, minor $PM_{2.5}$ emissions sources do not need to address PSD increment consumption at this time.

## V. Interim $PM_{2.5}$ Modeling Procedures

The modeling methodologies described below are based on guidance contained in the following EPA memos:

*Model Clearinghouse Review of Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS*, from Tyler Fox, February 26, 2010.

*Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS*, from Stephen D. Page, March 23, 2010.

### 1. Modeling Direct $PM_{2.5}$ Emissions

$PM_{2.5}$ modeled annual and 24-hour ambient impacts will be based on direct $PM_{2.5}$ emissions only. Both filterable and condensible $PM_{2.5}$ emissions must be included in the air quality modeling evaluation. The impact of $PM_{2.5}$ precursors, such as sulfur dioxide, does not need to be evaluated.

### 2. Background $PM_{2.5}$ Air Quality

A NJDEP or neighboring state's $PM_{2.5}$ monitor will be selected that represents background $PM_{2.5}$ in the vicinity of the source's impact area. The annual background $PM_{2.5}$ value should be based on the average of the latest 3-years of available data. The 24-hour background $PM_{2.5}$ value should initially be based on the average of the $98^{th}$ percentile 24-hour value measured over the latest 3-years of available data. The NJDEP 2007-2009 $PM_{2.5}$ monitoring data is presented in Table 1.

### 3. Calculation of Impacts for Comparison to SILs

a. The highest of the 5-year average of the modeled annual conconcentration predicted at each receptor should be compared to the annual SIL (0.30 $ug/m^3$) to determine if the source has a significant impact.

b. The highest of the 5-year average of the maximum modeled 24-hour conconcentration predicted at each receptor should be compared to the 24-hour SIL (1.2 ug/$m^3$) to determine if the source has a significant impact.

4. Multisource Modeling

On a case-by-case basis, other $PM_{2.5}$ sources in the vicinity of the source (<10 km) may be included in the modeling analysis if the proposed source impact is above the SILs and the selected $PM_{2.5}$ background monitor does not adequately reflect existing $PM_{2.5}$ concentrations in the area. Sources with $PM_{10}$ emission limits will be converted to $PM_{2.5}$ emissions using AP-42 and other available information.

5. Calculation of Impacts for Comparison to NAAQS

a. Compliance with the annual $PM_{2.5}$ NAAQS is demonstrated by calculating the maximum five-year annual average $PM_{2.5}$ concentration predicted at any receptor. This value should be added to the 3-year average annual background value from a representative $PM_{2.5}$ monitor and compared to the annual $PM_{2.5}$ NAAQS of 15 ug/$m^3$. If the source being modeled is an existing source and is located close to the background monitor being used, the modeled impact from the existing source at the monitor (based on actual emissions) can be subtracted from the annual background value.

b. Compliance with the 24-hour $PM_{2.5}$ NAAQS is demonstrated by calculating the five-year average of the maximum 24-hour average $PM_{2.5}$ prediction at any receptor. This value should be added to the 3-year average $98^{th}$ percentile 24-hour background value from a representative $PM_{2.5}$ monitor and compared to the 24-hour NAAQS. If there are problems meeting the NAAQS, the applicant has the option of defining the applicable 24-hour background concentration in greater detail as described in Section 8.2.2(b) in EPA's *Guideline on Air Quality Models*. This guidance specifies that the meteorological conditions of concern be determined for the source, and that background concentrations used are those that exist during these meteorological conditions of concern. The source's impact during periods of high 24-hour background concentrations should also be evaluated.

## Table 1. New Jersey Background $PM_{2.5}$ Concentrations

| City | County | 2007-2009 98th Percentile 24-Hour Avg. ($ug/m^3$) | 2007-2009 Annual Average ($ug/m^3$) |
|---|---|---|---|
| Atlantic City | Atlantic Co | 24.5 | 9.9 |
| Brigantine | Atlantic Co | 27.4 | 9.6 |
| Fort Lee | Bergen Co | 31.3 | 11.3 |
| Camden Lab | Camden Co | 33.0 [a] | 13.1 [a] |
| Pennsauken | Camden Co | 29.4 | 11.7 |
| Gibbstown | Gloucester Co | 26.7 | 11.4 |
| Union City | Hudson Co. | 32.6 | 13.0 |
| Jersey City | Hudson Co | 31.9 | 11.9 |
| Trenton | Mercer Co | 28.9 | 10.9 |
| Washington Crossing | Mercer Co | 26.7 | 9.3 |
| New Brunswick | Middlesex Co | 26.7 | 10.4 |
| Chester | Morris Co. | 25.5 | 8.8 |
| Morristown | Morris Co | 26.0 | 9.7 |
| Toms River | Ocean Co | 25.7 | 9.5 |
| Paterson | Passaic Co | 30.4 | 11.3 |
| Elizabeth Lab | Union Co | 32.2 | 12.7 |
| Elizabeth | Union Co | 30.9 | 11.6 |
| Rahway | Union Co | 29.5 | 11.5 |
| Phillipsburg | Warren Co | 28.7 | 10.9 |

a. Value represent 2006-2008 data. No data collected in 2009.

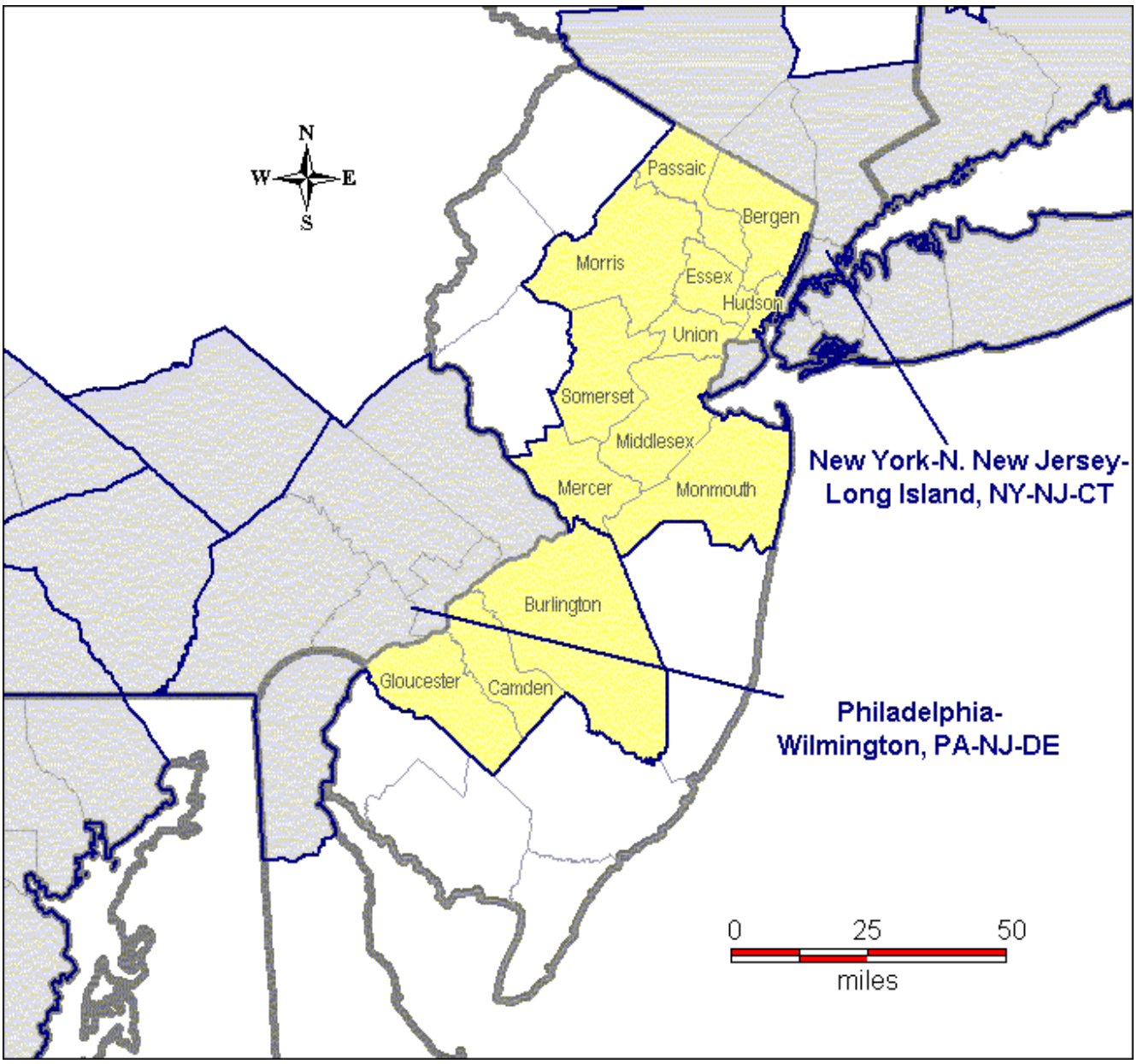


Figure 1. New Jersey PM-2.5 Nonattainment Areas

EPA designated nonattainment areas shown in yellow.